We would like to thank the reviewer for his/her constructive comments and suggestions on the manuscript. The modifications have been accomplished by replying to the reviewer's comments. The following is a detailed list of our responses and the changes we have made.

RC: The authors provide an insufficient description of experimental site. More information is needed to determine if site is appropriate for flux and storage calculations, particularly under typical nocturnal conditions.

AC: *We have included more descriptions of experimental site. For accurate nighttime eddy covariance study maintaining typical fetch condition practically quite difficult task due to large fetch length requirement at nighttime stable condition. The limitation of ideal fetch condition is common in most of the cases and our site is not different from others. At stable condition contamination from other farm and residence area might exist in our data but we have tried to minimize it by taking only in wind direction 45°-225° where maximum paddy cultivation area covered and also rejecting data at large fluctuation of CO_2 density condition.*

RC: Page 1206 Line 25: Sonic anemometer description appears incorrect.

AC: *We agree and have corrected the wrong information.*

RC: The paper does not address the difference in footprint sizes of flux measurements and concentration measurements at different heights.

AC: *We calculated footprint size and mention it in site description part. "The rice canopy reach maximum 1m of height at maximum growth stage and flux sensors are in 3 m, 12m and 32m, giving the tower footprint of about1.5 km, 6 km and 16 km respectively at typical nighttime conditions but at stable condition the fetch requirement extended 2-3 fold than typical nocturnal conditions".*

RC: No effort was made to estimate the nocturnal boundary layer depth, or leakage through the nocturnal boundary layer, and the effect this would have on the corresponding flux estimates.

AC: *We have already stated that it is our negative point not to calculated nocturnal boundary layer depth. But we also stated that it is essential to measure nocturnal boundary layer depth so it must be consider in future study.*

RC: Insufficient information about the eddy covariance data processing. Rotation method, frequency response correction.

AC: *We have included the rotation method that was applied in our data analysis. Prior to conducting the scalar flux computation, we applied double rotation to align the coordinate system with the mean wind.*

RC: The authors describe a large suite of met sensors – but are they all used in the paper?

AC: *We have excluded all unnecessary information*

RC: Why is soil heat flux measured in grassland and not in the paddy.

AC: *Due to some critical situation (commercial farm not to allow installation sensors and take other physiological parameter like LAI and crop biomass) we could not take measurement of most meteorological parameters from paddy field which was taken from nearby grassland for evaluating energy balance closure and other purposes.*

RC: The scalar budget equation given stated is not the complete equation and already includes simplifying assumptions. You should give the complete equation and state your simplifying assumptions – also there are more "original" reference sources.

AC: *We revised section 2.3 as the followings.*

2.3 CO_2 budget equation and EC method

The carbon dioxide mass conservation equation states that the CO_2 produced or absorbed by a biological source/sink is either stored in the air or removed by flux divergence in all directions. This equation has been developed and discussed in detail by various authors, notably Finnigan (1999), Finnigan et al. (2003), and Feigenwinter et al. (2004). The general equation for c scalar is

$$\left(\frac{\partial c}{\partial t}\right) + \left(\frac{\partial uc}{\partial x}\right) + \left(\frac{\partial wc}{\partial z}\right) = s(x,z,t) \tag{1}$$

where x is aligned with the local mean wind direction (assumed to be invariant with z in the measurement domain), z is perpendicular to the local terrain surface and u, w are velocity components parallel to x and z, respectively. s(x, z) is the specific source strength of c and molecular diffusion has been ignored.

After applying Reynolds decomposition, spatial integration over a control volume of height z and lateral extent 2L, neglecting the horizontal turbulent flux divergence and the horizontal variation of the vertical turbulent flux and applying the continuity equation, the equation is reduced to:

$$NEE = \int_0^z \frac{\partial c}{\partial t}dz + \overline{w'c'}(z) + \int_0^z \overline{w}\frac{\partial c}{\partial z}dz + \int_0^z \left(\overline{u}\frac{\partial c}{\partial x} + \overline{v}\frac{\partial c}{\partial y}\right)dz , \tag{2}$$

$$\quad\quad\quad\text{I}\quad\quad\quad\text{II}\quad\quad\quad\text{III}\quad\quad\quad\text{IV}$$

where *NEE* is net ecosystem exchange, term I is storage change (*Sc*), term II is turbulent transfer (*Ec*), term III is vertical advection, and term IV is horizontal advection. For a homogenous surface like our site, terms of III and IV are neglected and NEE is measured

based on *Ec* and *Sc* measurements (Aubinet et al., 2005). Therefore, we calculated NEE as follows:

$$NEE_{Ec} = Sc_1 + Ec_1 \qquad (3)$$

$$Sc_1 = \frac{\Delta C_1}{\Delta t} \times z_1 \qquad (4)$$

$$Ec_1 = \overline{w_1' c_1'} \qquad (5)$$

where NEE_{Ec} is the eddy covariance measurement of *NEE*; Ec_1 and Sc_1 represent the turbulent flux and storage change at 3.5 m, respectively; z_1 is the 3.5 m height; Δc_1 is the change of CO_2 density during time periods of focus; and Δt is the time periods (30 min).

RC: Page 1209 Lines 1-10: The method of estimation of change in storage is very crude and not acceptable for a paper in which the premise is examination of the veracity of storage calculations for capturing the entire carbon exchange. This method may result in significant underestimations of the storage term because of the CO_2 concentration only being measured at the top of the storage layer of interest.

AC: *We have changed the calculation method.*

RC: Page 1210 Line 4: Need to give reference for soil respiration model.

AC: *Reference has added accordingly.*

RC: Page 1210 Line 6: Do not define which air temperature was used in soil respiration model. Also authors do not justify why air temperature, instead of soil temperature, is used in respiration model.

AC: *We used 2.8 m height air temperature in soil respiration model. We used air temperature instead of soil temperature because soil temperature was measured in grass field and we found it was poorly correlated with soil respiration so, we used air temperature in our site. Another reason was that Saito et al. (2005) also used air temperature for paddy field.*

RC: Page 1210 Line 13: under nighttime conditions it is unlikely that you have unstable conditions. It is more likely that you have near neutral stable conditions.

AC: *We partly agree with you because u∗ filtering is well established for separating stable and unstable condition in nighttime data correction. It may include some near neutral stable conditions data but not all cases.*

RC: Page 1210 Line 19-20: why were data for high winds and highly turbulent conditions excluded? You do not give a justification for excluding this data.

AC: At *high wind speed, data creates large errors in flux estimation due to the non-linear dependence of the gas transfer velocity on wind speed. In general, wind speed is negatively correlated with air pressure so that low pressure systems which cause a drop in air CO_2 concentration associated with high winds.*
We exclude data at high wind and turbulent condition and threshold value selected based on time series of observed data.

RC: Page 1210 Line 23: what is the justification for using 15 umol/m^2/s as the upper limit for nocturnal NEE?

AC: *We have already stated that effective nighttime data range was taken based on experience and evaluation of observation data. We evaluated percent of data availability at different data range and found that within 0-15 umol/m^2/s maximum number of data were present.*

RC: Page 1210 section 2.5.3: Figure 2 provides a good basis for the selection criteria and processing description but the text became a bit confusing because of the use of NEEec and NEEsc both referring to NEE. Because many of the selection criteria were applied to NEE it wasn't as clear in the text if the selections were being applied to NEEec, NEEsc, both, or the combined values (i.e. NEE). Additionally, the rational behind applying the selection criteria to NEE (after merging NEEec and NEEsc is not clear. It would make more sense to apply appropriate selection criteria to Ec and Sc separately, because each measurement method has specific issues that may make it non-viable as a method for measuring surface exchange. For example, precipitation may affect NEE measured using Ec but not NEE estimated from surface boundary layer estimates.

AC: *In flow chart we mention clearly the data processing procedure also in text. We used u$_*$ filtering only to separate data from turbulent to stable condition for the storage change estimation, then all data were merged as NEE and followed all mentioned data selection criteria. We have changed a little bit in text mentioning the above condition.*

RC: Page 1213-1214: The respiration model does not include a term for soil moisture. Certainly in a rice paddy ecosystem changes in soil moisture must play a key role in determining the rate of soil respiration.

AC: *The same reason like air temperature and soil temperature we could not use soil moisture data as it also measured in grass filed which did not correlate with paddy soil respiration. We agree with you that in a rice paddy ecosystem changes in soil moisture must play a key role in determining the rate of soil respiration but it was our measurement limitation.*

RC: Page 1215 Line 1-2: The authors do not give evidence that the turbulent flux is zero at the upper level of the tower (32 m). They are making this assumption but show no

evidence to support this assumption. This assumption is important to the application of the storage change method of determining the fluxes.

AC: *We assumed turbulence flux zero at our target measurement height (32 m) but actually our data shown not zero rather around 1 $\mu mol\ m^{-2}s^{-1}$ at calm condition. It was probably due to large fetch including patchy house building and residence and we included it in our discussion part. The attached figure will give the evidence of fetch impacts.*

RC: The discussion section is primarily an extension of the introduction and more of others' research without saying much about the results obtained in the authors' study. Much more discussion and analysis of the authors' results are needed.

AC: *We have added some more explanation in this section.*

RC: The authors do not address the potential for advection affecting the nocturnal boundary layer storage change estimates of NEE. Although the site is flat, it is possible (particularily in regions of anthropogenic sources) that horizontal advection of CO_2 may affect the change in storage calculations. The authors must show that this is not the case at their site in order for their NEEsc calculations to be valid.

AC: *We agree with you that the site have advection affects on storage change measurement in 32 m height at calm condition due to large fetch including patchy house building and residence. We included it in our discussion part.*

Figure caption

Fig. 10. Nighttime NEE as a function of u∗ class measured at 3m (open square) and 32m (closed square) height. Vertical bar showing calculated standard error.